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Clinical significance of de Garengeot's hernia: A case of acute appendicitis and review of the literature

Theodoros Piperos[a], Vasileios Kalles[a,*], Yousef Al Ahwal[b], Evangelos Konstantinou[b], George Skarpas[b], Theodoros Mariolis-Sapsakos[b]

[a] Anatomy Lab, University of Athens, School of Nursery, Athens,Greece
[b] Surgical Department, Eugenideion Hospital, University of Athens, Athens,Greece

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ABSTRACT

INTRODUCTION: The presence of the appendix in a femoral hernia sac is known as de Garengeot's hernia. We report a rare case of an elderly woman with femoral hernia appendicitis and discuss the surgical pitfalls and considerations through a literature review.
PRESENTATION OF CASE: An 83-year-old woman presented with fever and right lower quadrant abdominal pain. Clinical examination revealed a femoral hernia. Ultrasonography confirmed bowel was present in the hernia sac. In the operation room, an acutely inflamed appendix was recognized within the sac. The patient underwent appendectomy and hernia repair with sutures.
DISCUSSION: Acute appendicitis within a femoral hernia is rare and multiple dilemmas exist regarding its treatment. An incision below the inguinal ligament is a reasonable choice in order to access the hernia sac. A mesh should be placed in non-infectious appendectomy while herniorrhaphy is preferred in cases of appendicitis.
CONCLUSION: The presence of the vermiform appendix in a femoral hernia sac is rare but the surgeon should be aware of this clinical entity. Prompt diagnosis and appropriate surgical treatment is the key to avoid complications.

1. Introduction

Rene Jacques Croissant de Garengeot, a surgeon from Paris, was the first to describe the presence of the appendix in a femoral hernia sac in 1731.[1] The first appendectomy of a de Garengeot hernia was performed by Hevin as early as 1785.[1] We report a rare case of an 83-year-old woman with acute appendicitis within a femoral hernia and discuss the surgical pitfalls and considerations through an up-to-date literature review.

2. Case

An 83-year-old woman presented in our clinic with fever and abdominal pain of 12 h duration. The patient reported no nausea, vomiting or change in bowel habits. She was obese (body mass index 31) and her past medical history was insignificant other than a previous laparotomy for gastric surgery. On examination, she was tender in right iliac fossa and had a non-reducible mass in the right groin. Bowel sounds were reduced and her temperature was 39 °C. Vital signs evaluation revealed tachycardia (HR = 110/min), tachypnoea (25/min) and hypotension (BP = 85/55 mmHg). Laboratory findings were within normal limits except for an increased white cell count (21.00 k/μL) with 90% neutrophils and elevated C-reactive protein (18.5). A strangulated femoral hernia was suspected and the patient was evaluated with ultrasonography, which showed bowel contents in the hernia sac.

The patient received immediately intravenous fluids and antibiotics (a 15/mg/kg dose of metronidazole and 1 g of cefamandole) and was taken to the operating room. Under general anesthesia, the femoral hernia sac was accessed through a standard oblique incision below the inguinal ligament. Within the hernia sac, we came across an infectious appendix as well as purulent fluid. After thorough drainage, the appendix was isolated and removed through the incision and the hernia was repaired with herniorrhaphy without the use of a mesh, due to extensive inflammation. The wound was closed in layers with absorbable sutures for deep subcutaneous tissues and staples for the skin.

The patient had an uneventful postoperative course, was allowed to drink on the evening of the surgery and was able to eat a normal diet two days after surgery. She was discharged on the third postoperative day and was seen on postoperative day 10 for removal of the staples. The histological examination of the appendix showed acute appendicitis.

3. Discussion

The presence of the appendix within a femoral hernia is an unusual finding, often encountered randomly during surgery. This

* Corresponding author. Perimeni 1-2, Nea Smyrni, 17121 Athens, Greece.
E-mail address: vassilis_kalles@yahoo.gr (V. Kalles).

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interesting condition has been termed as *de Garengeot hernia*, after the name of the French surgeon Rene Jacques Croissant de Garengeot that first described it in 1731. To date, fewer than 90 cases have been reported.[2] The appendix is reported to be present in 0.5–5% of all femoral hernias[2] and the incidence of appendicitis is even rarer, occurring in 0.08–0.13% of patients.[3] There is a high female predisposition (13:1), in line with the increased incidence of femoral hernias in women.[3] Hernia appendicitis usually occurs in a right inguinal or femoral hernia, but has also been reported in a left inguinal, umbilical, obturator and incisional hernia.[4] The inflammation may resolve by itself or lead to a variety of complications including abscess formation, necrosis of the hernia contents, bowel obstruction, necrotizing fasciitis and even death in older patients with delayed diagnosis.[5]

The rare occurrence of femoral hernia containing the appendix may be attributed to abnormal anatomic position and rotation of the bowel or from anatomic variations in the mobility of the cecum. It has also been suggested that a very large cecum that expands into the pelvis, can cause the appendix to enter a hernia sac.[4] Indeed, our patient had a large and relatively mobile cecum.

The clinical presentation of de Garengeot's hernia is usually that of incarcerated or strangulated femoral or inguinal hernia and consists of abdominal pain, tenderness and presence of a groin lump, often erythematous. The patient may be feverish and laboratory values can be atypical.

De Garengeot's hernia should be suspected in an elderly woman presenting with signs and symptoms of a strangulated hernia. The differential diagnosis should include, in addition to inguinal hernia, adnexitis, a varix node, ectasia of the Vena saphena magna, lipomas or other soft tissue tumors, lymphomas and hypostatic abscesses in retroperitoneal processes.[6]

Usually, the diagnosis of acute appendicitis within the hernia sac is made intraoperatively, although there are a few cases of preoperative diagnosis with computed tomography (CT) or ultrasound. A typical CT scan can reveal a tubular structure within the hernia sac, stranding of adjacent fat and a low-positioned cecum[7] while ultrasound can identify bowel contents in the hernia sac.[8] Abdominal X-ray does not aid in the diagnostic procedure, but assists in recognizing a small bowel obstruction.[9] Nevertheless, since imaging studies can be indeterminate, the final diagnosis and decision for treatment should depend on the surgeon's clinical judgment.

Emergency appendectomy and hernioplasty is the treatment of choice for this rare clinical entity, although the approach does not seem to be standard among authors, probably due to the scarcity of evidence. Appendectomy via the hernia sac is widely accepted while the laparoscopic approach is still controversial.[10] The surgeon must be alert for unpredicted intraoperative encounters, and the approach of infrainguinal oblique incision seems a reasonable choice that offers good exposure for exploration of the area.

The choice of repair of the femoral hernia that contains a contaminated appendix is also ambiguous. Generally, the use of prosthetic material such as mesh "plug" is not preferred in a contaminated field due to risk of infection. Repair by prosthetic mesh without infection or recurrence is possible in patients with no signs of inflammation, perforation or abscess formation.[9] The delay in diagnosis has been suggested to be the factor that contributes to the increased incidence of infection.[9] In our patient, we encountered a contaminated hernia sac. Thus, herniorrhaphy was a reasonable choice of repair, as it is the established treatment strategy in such cases.

4. Conclusion

The presence of the vermiform appendix in a femoral hernia sac is known as *de Garengeot* hernia. The surgeon should be aware of this clinical entity and include it in the differential diagnosis of right lower quadrant pain. Imaging studies such as ultrasound or CT will aid the final diagnosis. Appropriate management consists of appendectomy and herniorrhaphy.

Conflict of interest statement

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Consent

Obtained.

Author contributions

Theodoros Piperos, Yousef Al Ahwal and Theodoros Mariolis-Sapsakos performed the operation. Vasileios Kalles collected patient data, participated in patient's postoperative care and wrote the paper. Evangelos Konstantinou followed-up the patient. George Skarpas and Theodoros Mariolis-Sapsakos reviewed the article. All authors approved the manuscript.

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